ILLUSTRATED

CATALOGUE AND PRICE LIST

—OF—

ELECTRICAL

Apparatus and Supplies

MANUFACTURED AND FOR SALE BY

A. F. FLEISCHMANN, ELECTRICIAN.

ELECTRIC WORKS,

1226 Chestnut Street, Philadelphia, Pa.

1884.

PHILADELPHIA:
THE ALDINE PRINTING HOUSE, 716 FILBERT STREET.
1884.

PREFACE.

Having had an experience of thirteen years in the manufacture of Electrical Apparatus and the repairing of many makes of Instruments, I am enabled to present to the profession and public generally Electrical Apparatus of practical value, constructed in a manner as to be durable, economical and to produce the best effects. The prices are low for first-class Instruments, and much is saved in buying such than "cheap" (?) inferior Instruments.

I invite correspondence on any matter relative to the electrical science connected with the business, and will cheerfully give all information desired, within my power to present, as a practical electrician.

PURCHASERS' NOTICE.

All Instruments herein described, of less than four pounds weight, will be sent to any point in the United States by mail, postage prepaid, upon receipt of Catalogue price (cash with order).

All orders will receive prompt attention, and, to insure no delay in shipments, full shipping instructions, with the name, town, county and State, must be given.

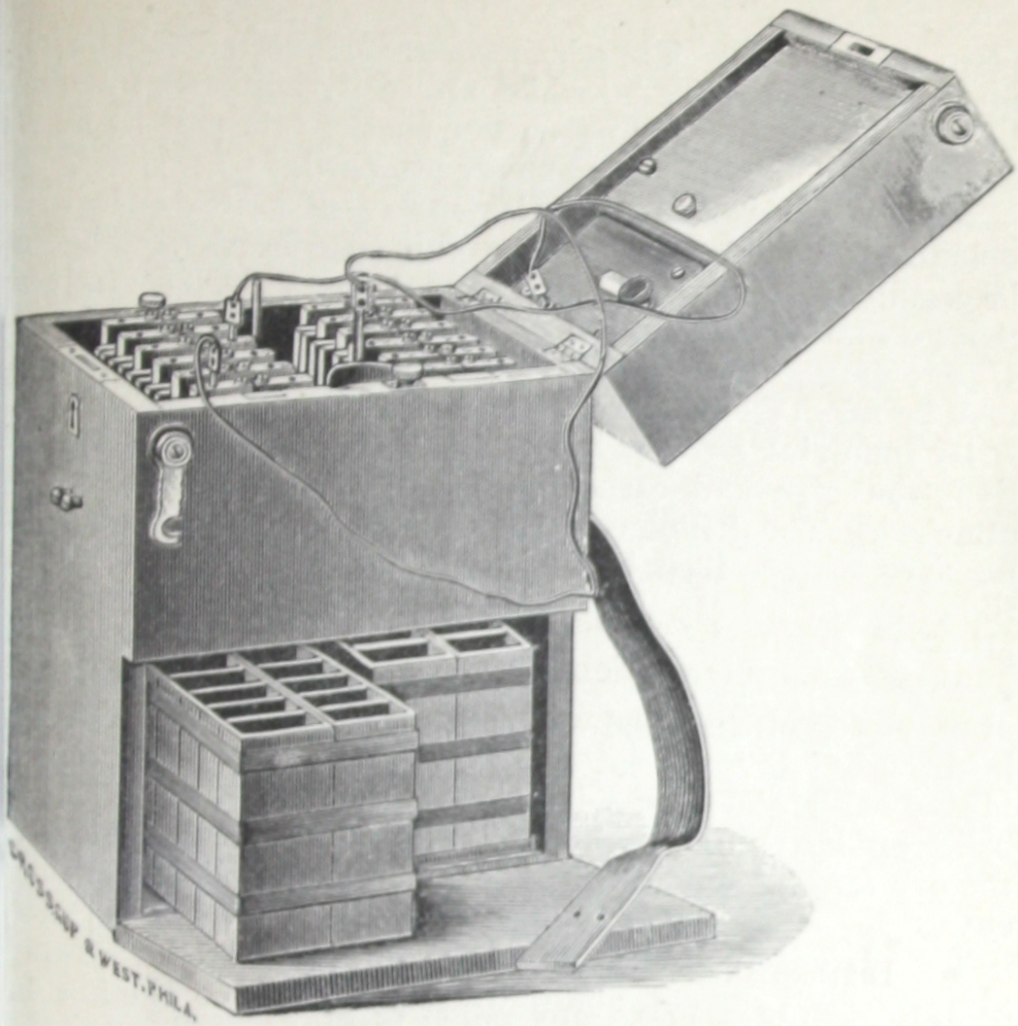
Remittances are to be made with the order by P. O. Money Order, Draft on Philadelphia or New York, or Registered Letter. When ordered to be sent C. O. D., one-third of the amount is to accompany the order.

I find it unnecessary to mention testimonials in my Catalogue, preferring the apparatus to merit the sale. I could fill a book with references, if I desired.

The prices are subject to change without notice.

Liberal rates to dealers.

IMPROVED GALVANIC BATTERY.



This Battery is the most convenient for the practice of physicians for office and call use now manufactured. The elements used are zinc and carbon. The fluid used is bi-chromate of potash solution (see page 13). It is so constructed that any part may be examined, or necessary attention, such as replacing of plates, refilling, etc., can be done by any one without trouble. The apparatus is arranged with ten, twenty or thirty cells. The cells are made of hard rubber, which are clasped by metal bands in series of tens, so that in case of one being injured it can be replaced conveniently at a small cost, not requiring a whole series of cells to be supplied. The series can be lifted from the tray to empty and recharge. Either series of elements may be used, combined or independently, so that when using less than the full number there is a saving of plates and fluid in the remaining cells.

So as to vary the intensity or the quantity of current, the half or whole depth of the cell can be used at pleasure by drawing up the tray-rods and securing them at a desired elevation by means of a small lever, which act immerses the

plates in the cells. The elements are connected for use by means of plug end cords, which are easily adjusted, one cord being bifurcated so as to prevent a shock to the patient by the change of the number of elements attached.

A great advantage over other makes of batteries is to be able to use your battery if one cell is out of order. This can be readily done, as you can connect your elements at any point desirable, or loop the connections of the injured cell. Unscrewing a thumb-nut on the tray-rod, the series of plates may be taken from the case and easily examined.

By removing a screw holding the element-bracket in position, the zinc and carbon plates are readily removed or attached. The drippings of the plates, that cause much annoyance, are received by a shallow trough arranged on the top of the hydrostat, in which space blotting paper may be placed to absorb the liquid; this is generally not provided for. For the convenience of transportation, the hydrostat is placed over the top of the cells, which is pressed down by rods and held firmly when the lid is closed. The lid of the case is hinged at the side, instead of at the back, to avoid the Battery being top-heavy and easily upset; it is divided in two parts, the one for the commutator and the other for the electrodes, etc.

The plates have an acting surface of $8\frac{1}{2}$ square inches each, giving a good current, and power equal to twice the number of cells of some makes of batteries.

The ten cell Batteries are chiefly used for the eye, the ear, the nasal cavity for catarrh, the uterus, and electrolysis of small tumors.

With a twenty cell Battery a physician can treat almost any case, but with a thirty cell Battery, or a ten cell and a thirty cell Battery, making forty cells, a physician has as much current at command as he may ever need for rare cases.

If a power of forty, fifty or sixty cells is desired, it is advisable to purchase two batteries and connect them, as you will find a single large one will be unhandy for transportation. An interrupter handle, a pair of universal handles, cylinders, sponge discs, and silk cords accompany each Battery.

All metallic parts are finely nickel-plated.

Price, complete, 10 cells	$25 00
" " 20 "	45 00
" " 30 "	65 00
Galvanoscope	5 00

Automatic Rheotome	$10 00
Fleischmann's Electrical Pendulum Rheotome . . .	20 00
Combination Battery (that is, Galvanic and Faradic), with the No. 1 Faradic instrument, extra . . .	25 00
With the No. 2 Faradic instrument, extra	16 00
" " " 3 " " "	12 00

In many cases it is convenient to have them combined, but I should recommend persons to procure them separately, as often they need but the one at a time.

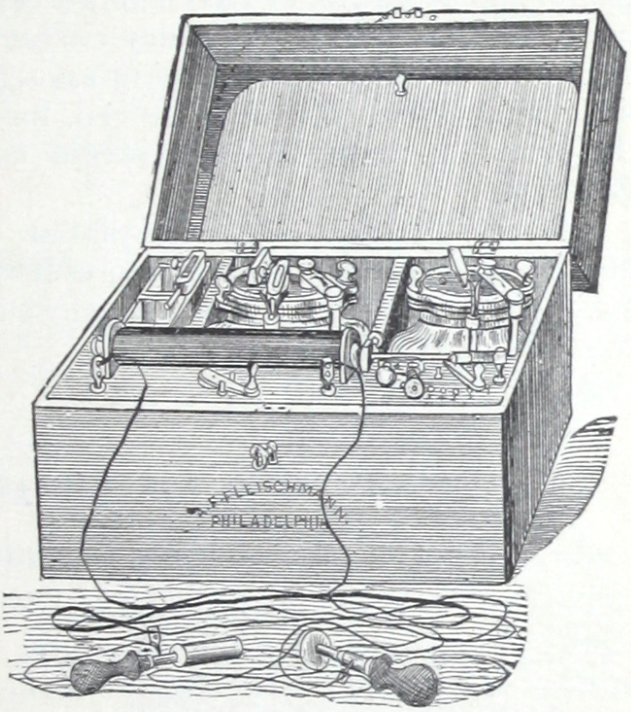
My galvanic batteries are the most complete now made.

All Makes of Galvanic Batteries Repaired and any Special Design Made to Order.

FARADIC BATTERIES.

FLEISCHMANN'S PENDULUM FARADIC BATTERY.

DOUBLE CELL.



This Battery is designed for the physician's office and call use. It fills a long sought-for want. I have made a series of experiments with the interrupters for Batteries, so as to be able to control the interruptions of the current, to have them uniform, regular and soft to the sensation, so as to be able to interrupt the current at about eighty up to several hundred per minute.

At last I succeeded to invent what I call a Pendulum Interrupter, by which I am able to produce the wished for result, as stated before. Other advantages over Batteries producing similar interruption are, when the interrupter is at rest, it is nearest to the point of attraction to a magnet, which produces the movement of the pendulum. There are no

loose connections, like at axle points, etc., and it requires less battery power than any other to keep up the interruptions. The instrument has also a very quick interrupter attached, either of which can be used. Both or one of the cells may be put in action, according to the power desired.

The convenience of having two cells is, should the one run down in power the other can be substituted, or should both be weak they can be used together.

This instrument has an extra secondary coil of great intensity, besides the ordinary coils: The primary and galvanic, the secondary, the secondary of great intensity, the combination of the secondary and secondary of great intensity, or the combination of the first three currents, either of which is connected for use by means of the switch, and the polarity changed by means of the commutator.

NOTE.—By primary and galvanic current, I mean that the Battery is arranged to have the galvanic current of the number of cells used in the primary current, this current will decompose. The zinc, after being amalgamated, requires very little attention. The Battery cell, for convenience of use, is the same as used for my single cell Pendulum Faradic Battery.

All metallic parts are nickel-plated. The instrument, with universal handles, sponge discs, cylinder handles, foot-plate, etc., accompany the Battery, enclosed in a polished walnut case 10x7$\frac{3}{4}$x6$\frac{1}{2}$ inches.

Price $35 00

SINGLE CELL FARADIC APPARATUS.

No. 1. Fleischmann's Pendulum Battery.

This Battery is constructed similar to the Double Cell Battery. It is smaller, without the extra secondary coil of great intensity, but one cell, and without the switch. The Battery has six currents, which differ in galvanic, magnetic, inductive and electrolitic effect. The polarity of these currents may be changed during application, by means of the commutator.

The Battery cell is arranged fluid-tight, and not requiring the emptying of the fluid after use, thereby preventing the spilling and bottling of the solution. The solution used to charge the cell is bi-chromate of potash (see page 13). The zinc plate requires no attention after first amalgamated, and when not used is placed in a small cup, in which about an

ounce of mercury is put, which produces a good coating of amalgam. If the plate is used up it can be replaced at a small expense. When the Battery is to be used, the rubber cork is drawn from the aperture in the top of the cell, the zinc is dropped into the solution, and connected at its proper post.

I have tested these battery cells, and have found them to run the instrument, without much variation of power, from five to eight hours continuously; as in most cases they are used but one-quarter hour at a time, they will work satisfactory three to four weeks with a single charge of solution costing but ten cents.

The cords have plug ends attached, which fit firmly in the sockets of the battery poles and handles.

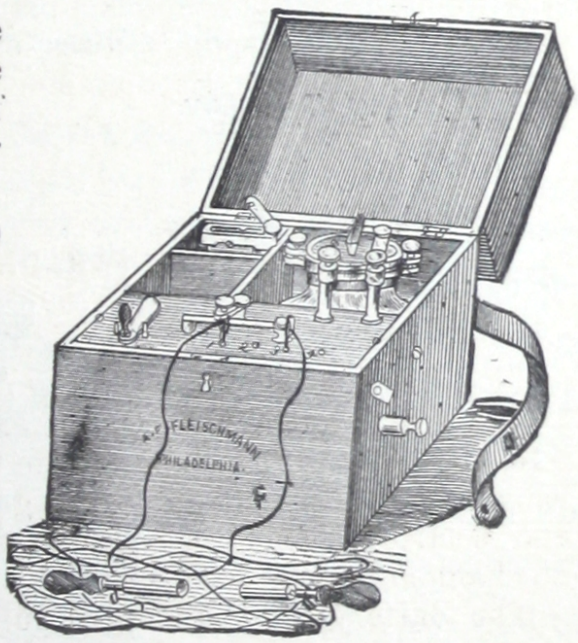
All metallic parts are nickel-plated. The Battery is put up in a polished walnut case, with universal handles, sponge discs and silk cords.

Price, ... $27 00

No. 2. FARADIC BATTERY.

No. 2 Battery is the same in construction as the No. 1, with the exception of my pendulum interrupter and no foot-plate.

Price, ... $20 00



No. 3. Faradic Battery.

This Battery is the same as the No. 2, without the commutator. With universal handles, cylinders and sponge discs. Weight 4½ lbs.

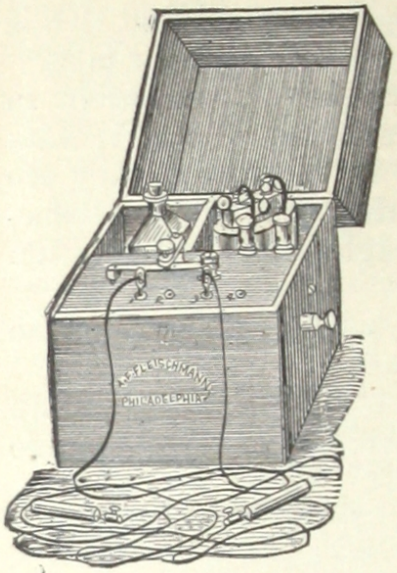
Price, ... $15 00

No. 4. Family Faradic Battery.

This Battery is the same as the No. 3, but brass finish and plain attachments.

Price, ... $12 00

No. 5. Six Current Family Battery.



No. 5 FARADIC BATTERY.

This Battery is operated by the Smee Cell, using diluted sulphuric acid for solution (see page 13). The six currents differ in galvanic, magnetic, inductive and electrolitic effect. Plain attachments accompany it.

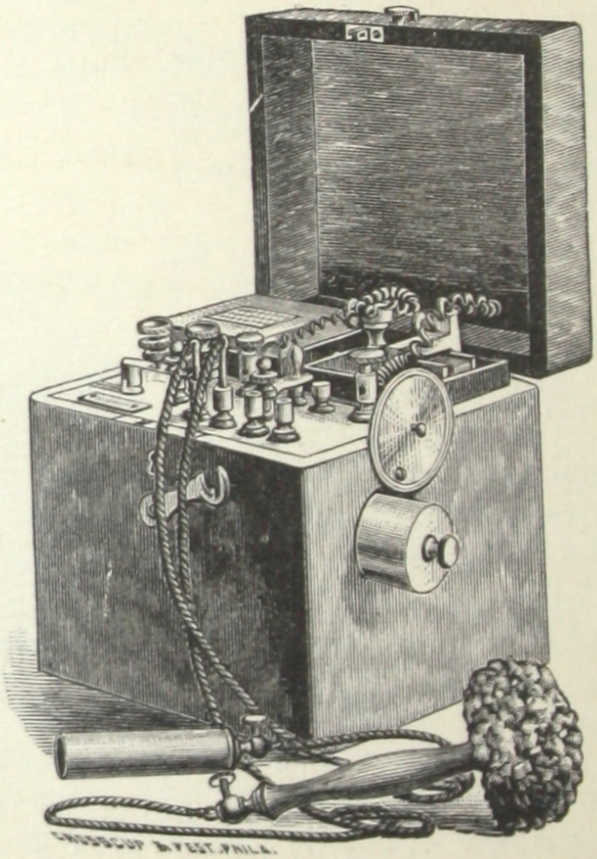
Price, ... $10 00

No. 6.
Family Faradic Battery

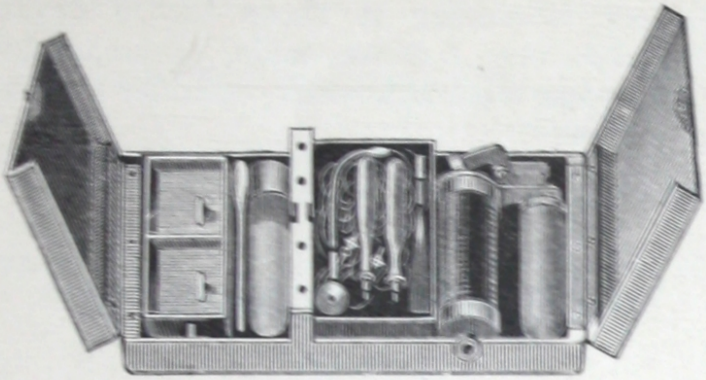
This Battery is more powerful than the No. 5, and has six currents, same as No. 1, with Smee Cell. All parts nickel-plated.

Rubber Battery Cells are used, and they are constructed in a manner to be a very convenient form of instrument.

Price, complete, . $15.00



IMPORTED POCKET FARADIC BATTERIES.



No. 7. GAIFFE BATTERY.

The current is received from two cells, consisting of a zinc and carbon element. The exciting chemical consists of bi-sulphate of mercury dissolved in water. The vibrator, by means of a lever, can be disconnected, thus stopping the current at will; by the same lever the interruptions may be produced by the pressure of the hand on it. The case, opening with two lids endways, is made of polished mahogany, size 7½ inches long, 4 inches wide and 1½ inches thick, weight 1¼ pounds, with cylinders, insulated handles, silk cords, an oval insulated stem electrode, ball electrode, brush electrode and bi-sulphate of mercury accompany the Battery.

Price $10 00

No. 8. GAIFFE BATTERY.

This Battery is the same as No. 7. Case 6½ inches long, 4 inches wide, 1½ inches thick, and has one lid. With cylinders, insulated handles, silk cords and bi-sulphate of mercury.

Price $6 50

The Gaiffe Batteries, although small, are powerful, owing to the fineness of wire and silk insulation employed in making the helix. They have been in use a great many years, are neat in construction, give off no perceptible fumes, can be started within a minute, and replaced in the pocket in the same time.

One charging of the cells will maintain a current for one hour. As a powerful Pocket Battery it has no equal; still the larger Batteries are more durable and run longer with a single charge.

Extra Zincs, per pair . . . . . $ 25
Bi-sulphate of Mercury, per oz. 10c . . . . . lb. 1 25
Extra Rubber Cup, Double Cell 1 50

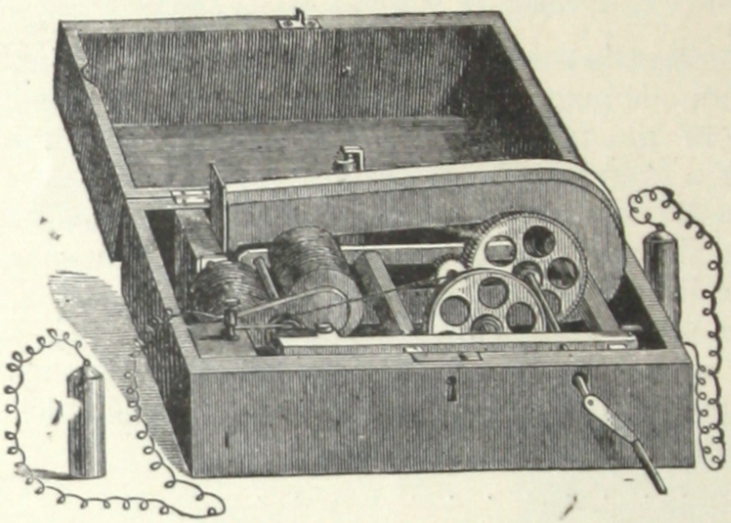
No. 9. French Battery.

This Battery is similar to those before described, but smaller, $4\frac{3}{4}$ inches long, 3 inches wide, $1\frac{1}{2}$ inches high, has a single cell, complete with silk cords, cylinder handles and bi-sulphate of mercury.

Price, complete $5 00

MAGNETO-ELECTRIC MACHINES.

No. 10,



The current is produced by turning a lever, which puts in motion gearing, driving at a rapid rate, by means of a belt, a magnet before the face of a permanent magnet. No chemical is used. The current produced by all makes of this style of machine is not as pleasant to patients as the Faradic Batteries.

Price, complete $8 00

"NEFF" MEDICAL BATTERY.

No. 11.

This Battery I make specially for a few customers who have used them some time. The cell used for action is on the principle of the Grove Battery, namely: zinc cup, porous cup and platinum strip; diluted sulphuric and nitric acids are used, or a sulphate of copper cell may be used, composed of a copper box and a zinc plate, charged with dissolved sulphate of copper.

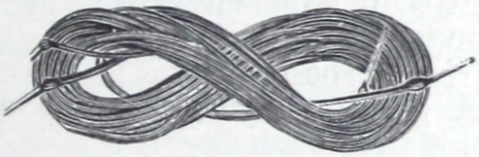
Price, complete, brass finish	$15 00
Zinc cup for Grove Cell	1 50
Porous cup " "	25
Platinum and connection for Grove Cell	1 75
Copper box	2 50
Zinc plate, square, size 5 in.x3½x2½	1 50
" " " " 4 in.x3 x2¼	1 25

Estimates given for any form of Electro-Medical Batteries, and a specialty made of repairing all makes.

SUPPLIES FOR GALVANIC AND FARADIC BATTERIES.

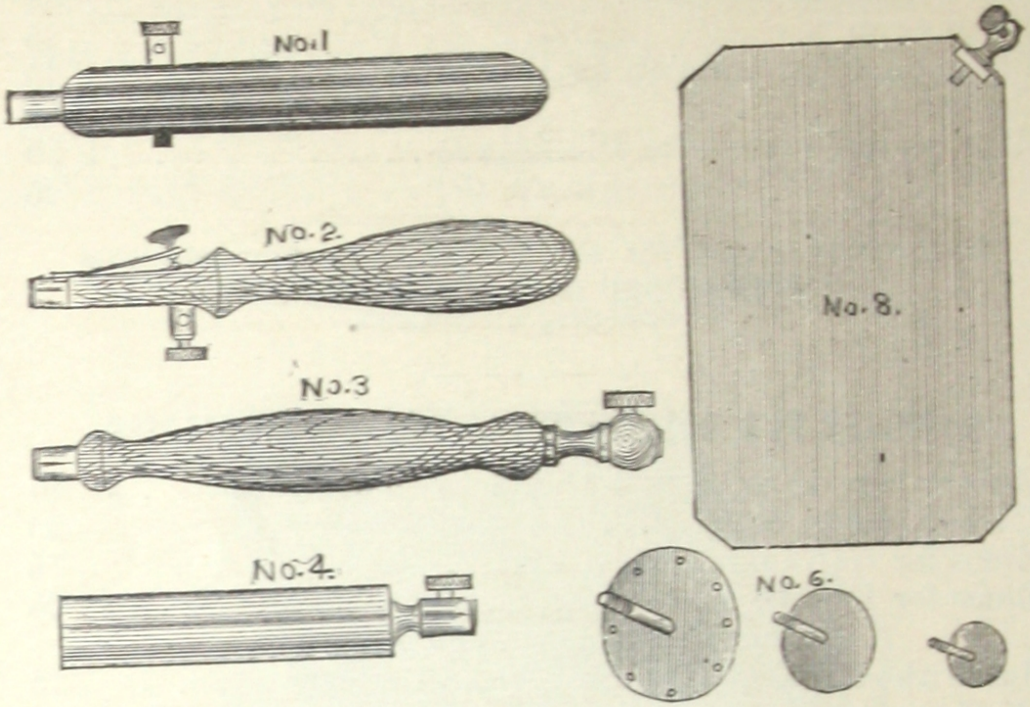
Rubber cup, 4½ in. high x 1 in. x 15-16 in., each	$ 40
Carbon plates, each	25
Zincs for Galvanic Battery, each	15
Zincs for Faradic Battery, each	25
Zincs by the dozen at a reduction.	
Jar with cemented ring for Faradic Battery	75
Bi-chromate Battery Cell, same as described page 4, for Faradic Battery, brass	2 75
Bi-chromate Battery Cell, same as described page 4, for Faradic Battery, nickel-plated	3 00

CONDUCTING CORDS.



1½ yards Silk Tinsel Cord, with improved plated tips, per pair	$ 65
2 yards Silk Tinsel Cord, with improved plated tips, per pair	80
1½ yards Cotton Tinsel Cord, with improved brass tips, per pair	50
2 yards Cotton Tinsel Cord, with improved brass tips, per pair	60
1½ yards Plain Cord, per pair	40
2 yards Plain Cord, per pair	50
Rubber Covered Cord, very suitable for Bath purposes, per pair	1 75 to 3 00

ELECTRODES.



Great care is taken in making the Electrodes of the best material and shape.

No. 1. Universal Handle, hard rubber, with open circuit-breaker attached, nickel-plated, each $1 50

1½. Same as No. 1, but closed circuit-breaker, each 1 75

2. Same as No. 1, polished walnut, each 1 00

2½. Same as No. 1½, polished walnut, each . . . 1 50

3. Universal Handle, without circuit-breaker, nickel-plated, each 75

3½. Short Universal Handle for plug connections, per pair 75

4. Cylinder Handles, nickel-plated, per pair 75 and 1 00

5. " " brass, per pair . . . 60 and 75

6. Sponge Discs, nickel-plated, each . . . . 20 to 50

7. Universal Sponge Handle, each 75

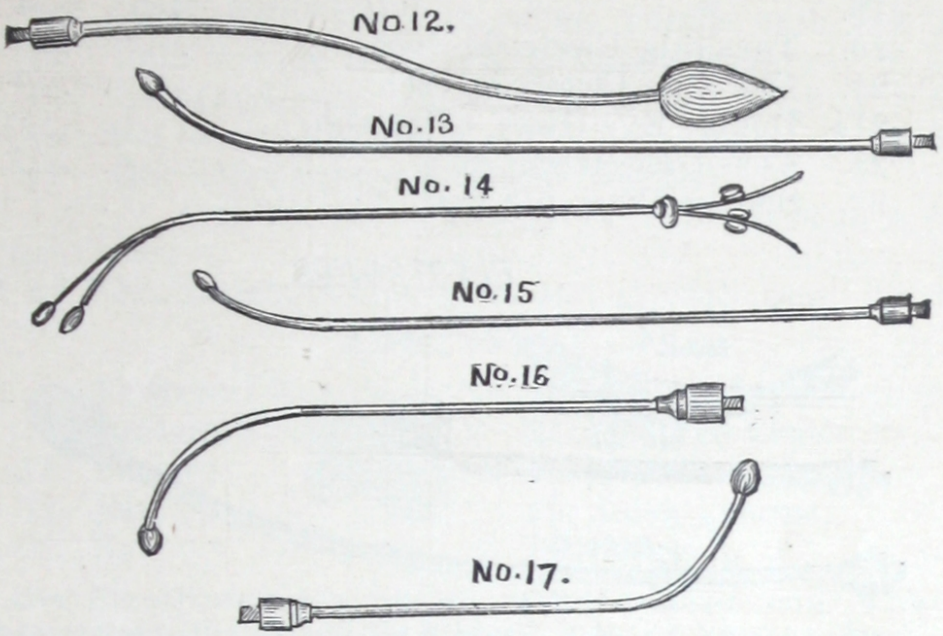
8. Foot Electrode, copper, 4½x9½ inches, each . . 65

9. Same as No. 8, nickel-plated, each 85

10. Foot Electrode, copper, 8x9½ inches, each . . 85

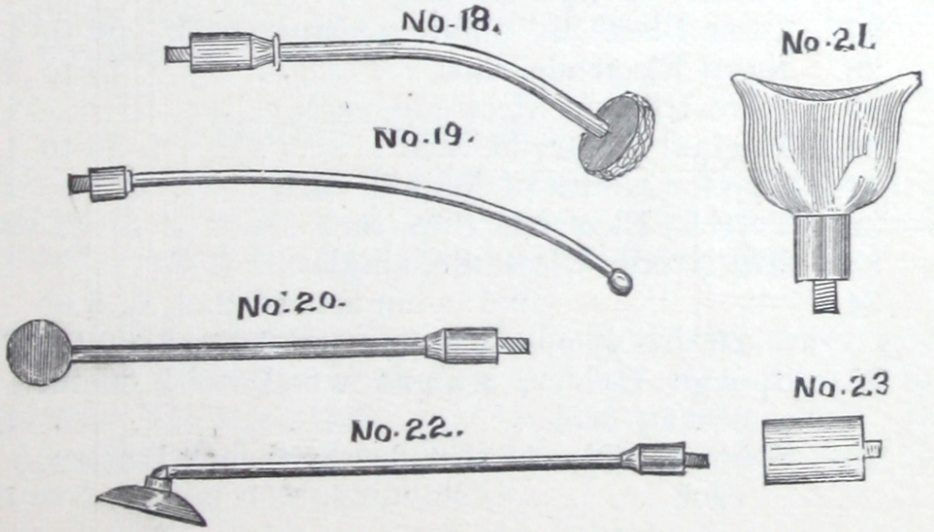
11. Same as No. 10, nickel-plated, each 1 00

ELECTRODES.



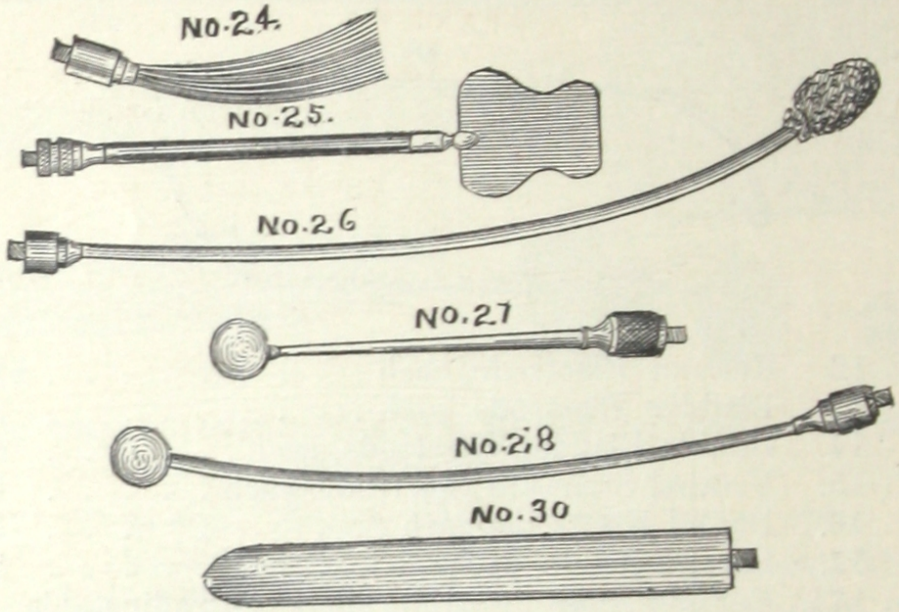
No. 12.	Rectum Electrode, each	$1 40
13.	Bladder Electrode, each	1 40
14.	Double Bladder Electrode, each	2 50
15.	Urethal Stricture Electrode, each	1 00
16.	Dental Electrode, each	1 00
17.	Ear Electrode, each	1 00
17½.	Ear Electrode, speculum shape with adjustable Stem, each	2 00

ELECTRODES.



No. 18.	Laryngeal Electrode, external use, each . .	$2 00
19.	" " internal use, each . .	1 50
20.	Tonsilitis Electrode, each	1 50
21.	Eye Cup Electrode, each	1 50
21½.	Double Eye Glass, adjustable	6 00
22.	Tonsil Electrode, each	1 50
23.	Sponge Cups, per pair	75

ELECTRODES.



No. 24.	Scourge Brush, each	50 to $1 00
25.	Tongue Electrode, with insulated section for the teeth, each	1 25 to 1 75
26.	Fauce's Electrode, each	1 25
27.	Ulcer Electrode, different shapes, each .	50 to 1 50
28.	Nasal Electrode, each	75 to 1 50
29.	Intra-Uterine Electrode, each	1 50
30.	Vaginal Electrode, each	1 50 to 1 75
31.	Cup for mouth of Womb, each	1 50
32.	Testicle Electrode Cup, each	2 50
33.	Gilt Needle Electrode, single	1 00
34.	" " " in sets of 2, 4, 6, 8 or 10, insulated, except on point . .	2 00 to 12 00
35.	Sponge Holder, walnut wood, with metal socket, each	1 25
36.	Sponge Holder, hard rubber, with metal socket, each	1 75

No. 37. Sponge Holder on side of handle, walnut and metal socket, each $1 50
38. Same as No. 37, with rubber handle, each . 2 00
39. Bath Sponge Holder, large handle, each . . 2 50
40. Galvano-Cautery Electrodes, each . . 1 50 to 7 50
41. Set of six Electrodes 10 00
42. Galvano-Cautery Electrode Handles, each . . . . . 2 00 to 5 00
Sponges, each . . . . . 10 to 30
Set of Electrodes, in fine velvet and morocco case 12 00

CONTENTS.

No. 3.	Universal Handle.	No. 23.	Sponge Cup Electrode.
" 12.	Rectum Electrode.	" 24.	Scourge Brush "
" 13.	Bladder "	" 28	Nose "
" 17.	Ear "	" 29.	Intra-Uterine "
" 21.	Eye "	" 30.	Vaginal "

All the Electrodes are heavy nickel-plated, and, where necessary, insulated by French gum or hard rubber.

Any description of Electrodes made to order.

BI-CHROMATE OF POTASH SOLUTION.

(Electropoion Fluid.)

For the Faradic Battery, Grenet Cell, Bunsen Porous Cup, etc.—To three pints of cold water add four fluid ounces of sulphuric acid; when this becomes cold mix it with bi-chromate of potash, finely pulverized, about four ounces; also add a few drops of nitric acid. Mix it well.

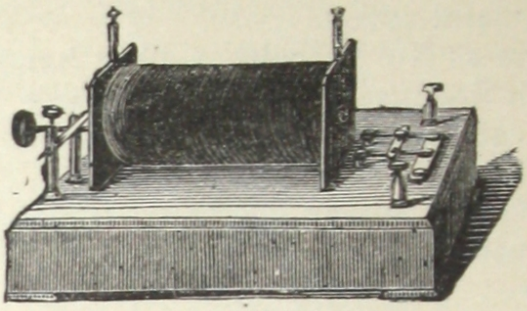
For the Galvanic Battery, Motor Battery Cell, Grenet Cell, etc.—Mix with the above four drachms of bi-sulphate of mercury dissolved in a half pint of water. This solution keeps the zinc amalgamated.

DILUTED SULPHURIC ACID.

For Smee Cell and Bunsen Battery.—Mix twelve to fifteen parts of water with one part of sulphuric acid (fluid measure). Allow the mixture to cool before using.

NOTE.—When mixing the sulphuric acid with water, pour the acid in the water, half the quantity at a time, using glassware. Be sure not to pour the water in the acid. By doing so the glass will not break, as often it does from the heat produced by mixing suddenly.

INDUCTION COILS.



Induction Coil, with automatic interrupter, giving a spark of $\frac{1}{8}$ inch $4 00

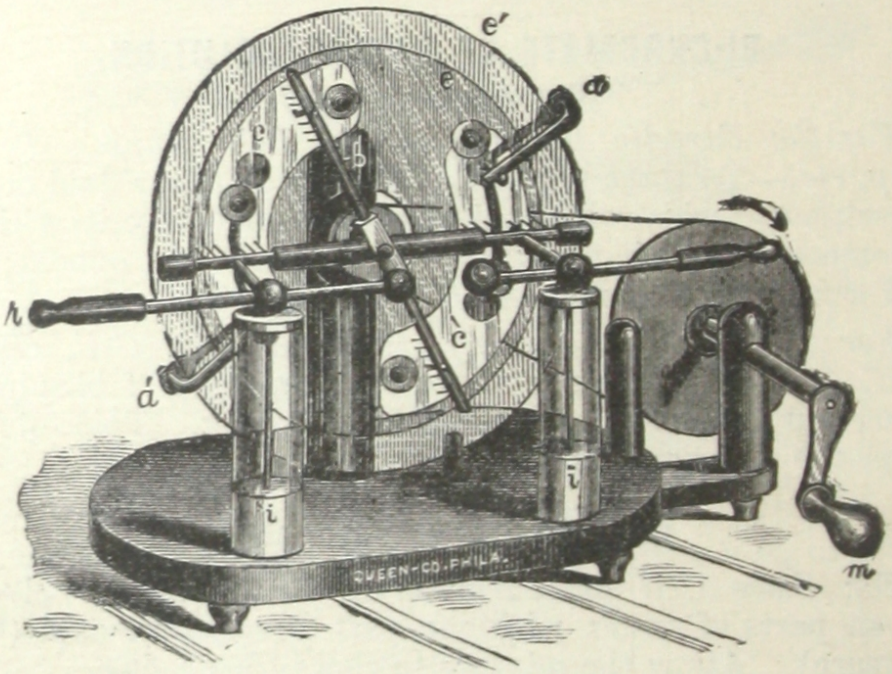
Induction Coil, with automatic break and commutator, giving a spark of $\frac{1}{4}$ inch 8 00

Induction Coil, with automatic break and commutator, giving a spark of $\frac{1}{2}$ inch 12 00

Induction Coils of Large Size made to order.

6-inch Geissler Tube, each 75

NEW TOEPLER-HOLTZ ELECTRICAL MACHINE.



No. 1.

No. 1. New Toepler-Holtz Electrical Machine: gives long and brilliant discharges, self-charging, works in all weather. Diameter of revolving plate 26 centimeters=10$\frac{1}{2}$ inches, giving 5-inch spark. Mounted on finely polished base Price, $25.00.

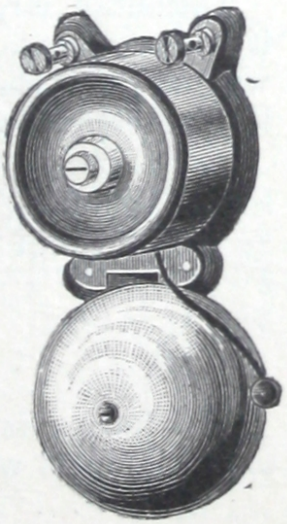
No. 2. New Toepler-Holtz Electrical Machine: self charging, more finely finished than No. 1, fitted with rubber supports, with neat and new arrangement for adjusting the combs, etc., to the plates; also, with the adjustments for the plates. Diameter of revolving plate, 31 centimeters=about 12½ inches. Price, $50.00.

No. 3. New Toepler-Holtz Electrical Machine: self-charging and finished same as No. 2, and fitted with rubber supports, with neat and new arrangement for adjusting the combs, etc., to the plates; also, with the adjustments for the plates. Diameter of revolving plate, 41 centimeters=about 16½ inches, $80.00

No. 4. New Toepler-Holtz Electrical Machine: self-charging, finished same as No. 2, and fitted with rubber supports, with neat and new arrangement for adjusting the combs, etc., to the plates; also, with adjustments for the plates. Diameter of revolving plate, 52 centimeters=about 21 inches, $115.00

Nos 2, 3, 4 are elegantly mounted on polished mahogany base, with Geissler tube attachment, conical bearings for rubber supports, etc., etc. They are very popular on account of their elegance of design, fine finish (a very important point where electricity is used at such *high tension*, as in the Holtz machine), convenience and adaptability to the purposes intended, and, *above all*, on account of their constancy of action, etc., etc. New Toepler-Holtz will undoubtedly be *the machine of the future.*

IRON BASE BELLS.



They are found to be substantial and easily adjusted. They give a very loud sound, and are used in schools, offices or dwellings (acoustic telephone lines), also as Burglar Alarms. Single stroke or Vibrating Bells.

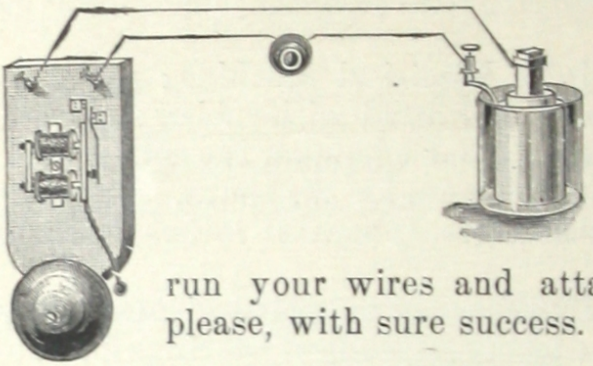
These Bells are made in the best manner for the prices, and will be found to work very satisfactory.

PRICE OF IRON BASE BELLS.

	Brass.	Nickel-plated.
2½ inch Vibrating or Signal Bell . . .	$2 00	$2 50
3½ " " " " . . .	2 25	2 75
4 inch Bell	3 50	3 75
5 " "	4 25	4 75
6 " "	5 25	6 00

Larger sized Gongs made to order.

FLEISCHMANN'S ELECTRIC BELL OUTFIT.



Electric Bells are more easily put in than the ordinary pull mechanical bells. After reading through our directions, which accompanies each outfit, you are able to run your wires and attachments wherever you please, with sure success.

OUTFIT No 1.

Price, complete . . . . . $2 50.

Including good Battery Cell, polished Bell on walnut base, polished ash or walnut Push Button, fifty (50) feet double insulated copper leading wire, chemicals, etc., and all necessary directions for putting in any house, or from house to house.

OUTFIT No. 2.

Price, complete . . . . . $4 25.

Including large Battery Cell, 3½-inch Bell on japanned iron base frame, with nickel-plated cover, polished ash or walnut Push Button, seventy-five (75) feet double Insulated leading copper wire, chemicals and all necessary directions.

Small Vibrating Bell, on wood base	$1 00
2½ inch Walnut Box Bell	1 50
3 " " "	1 75
3½ " " "	2 00

WOOD BOX BUZZARS.

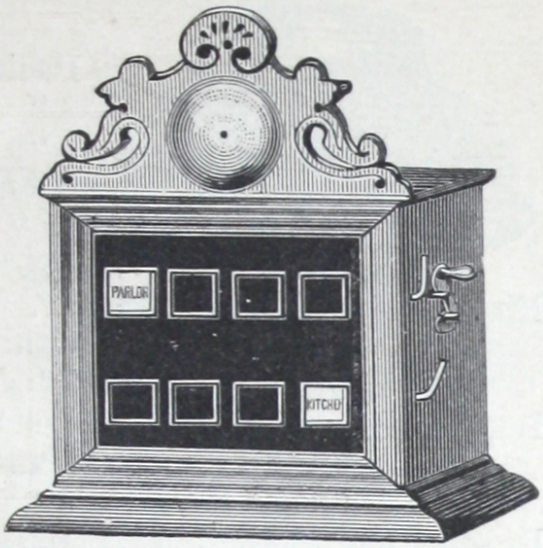
The Buzzar is meant to be used in cases where a person is to be signalled without causing general attention.

Price $2 00

IMPROVED ANNUNCIATORS.

STYLE NO. I.

For Private Residences, Banks, Offices, &c.



This is a new style drop Annunciator. There is no name or figure indication visible until the made connection causes the drop indication to appear, thereby avoiding the confusion which necessarily takes place if all the indications are visible. After the indication appears it can be adjusted by a simple lever. The bell and magnet are mounted on a metal base; in this way they are not affected by the warping or swelling of the wood. They are furnished in walnut or ash cases.

4	Indications, including	Bell	. . . . .	$17 00
6	"	"	"	20 00
7	"	"	"	23 00
8	"	"	"	25 00
9	"	"	"	27 00
10	"	"	"	30 00

$2 00 extra for each additional number.

STYLE NO. 2.

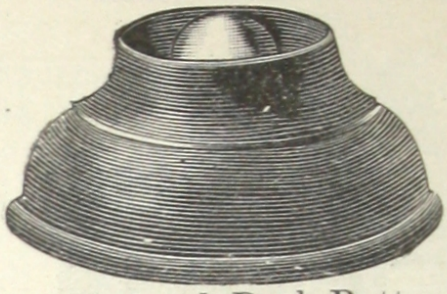
4	Indications, complete	. . . . .	$13 00
6	" "	. . . . .	16 00
8	" "	. . . . .	19 00
9	" "	. . . . .	21 00
10	" "	. . . . .	23 00

STYLE NO. 3. ANNUNCIATOR BURGLAR ALARM.

The Annunciator is arranged as before mentioned, and in addition has a continuous ringing attachment, so that if a room is entered by a window or door the indication drops and remains so; the bell also keeps on ringing till switched off. It is also arranged with a silent test.

4	Indications, complete	. . . . .	$25 00
6	" "	. . . . .	31 00
8	" "	. . . . .	37 00
9	" "	. . . . .	40 00
10	" "	. . . . .	43 00

MATERIALS FOR BELLS, ANNUNCIATORS, &C.



Push Buttons, bl'k walnut $ 25
" " ash 25
" " rosewood . 30
Bronze Push Buttons . . 50
" " " with "Push" on button . . . 75
Nickel-plated Push Button 75
" " " with "Push" on button . 1 00

Push Buttons of special designs made to order.

Improved Burglar Alarm Door Springs, each 35
" " " Window Springs, each . . . 30
" " " " " plain, per pair 10
Bronze Door Pulls . . . . . 2 00 to 3 50
Double-pointed Tacks, tinned, per box . . . . . 10 to 14
Ornamental Brackets, per pair 50
Lightning Arrester and Ground Switch, on wood base 90
" " " " " " rubber " 1 25
Porcelain Insulators, for line, with screws, per doz. 25 to 40

All styles of Keys, Bell Pulls, etc., made to order.

SWITCHES.

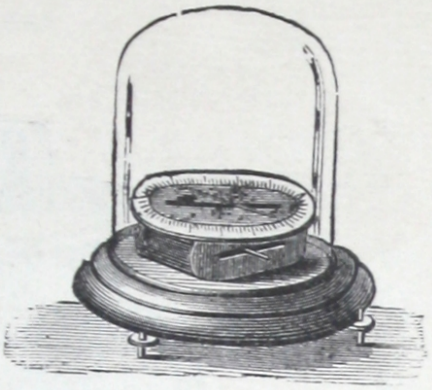
Circular, walnut base, 1 connecting point . . . . . $ 35
" " " 2 " " 40
" " " 3 " " 45
" " " with posts, 1 connecting point . 90
" " " " " 2 " " . 1 10
" " " " " 3 " " . 1 25
Hard rubber base, 1 connecting point 60
" " " 2 " " 65
" " " 3 " " 70
" " " with posts, 1 and 2 connecting points 90
" " " " " 3 and 4 " " 1 00

MAGNETS.

Electro Magnets, common . . . . . 75 to $1 25
" " with rubber flanges . . . . 1 00 to 3 00
Magneto Machine Magnets, 4 inch 75
" " " 6 " 1 50
" " " 8 " 1 75
" " " 9 " 2 50
Polished Cast Steel Bar Magnets, $\frac{1}{4}$x$\frac{5}{8}$x4 inches . . . 30
" " " " " $\frac{1}{4}$x$\frac{3}{4}$x6 " . . . 50

Magnets any shape or size to order.

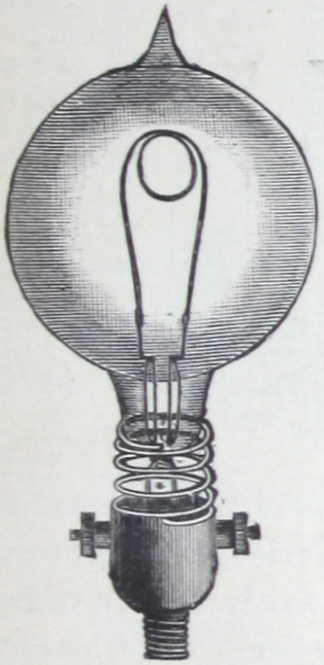
GALVANOMETERS.



Galvanometer, with Astatic Needle, on rosewood base, with leveling screws, graduated circle and glass cover $15 00

Detector Galvanometer, horizontal . . . . . 3 00 to 6 00

Detector Galvanometer, vertical . . . . . 10 00 to 25 00



INCANDESCENT ELECTRIC LAMP.

Swan's Incandescent Electric Lamp, 1 to 20 candle power, with patent spring holders, same as used in London, $4 50

Incandescent Electric Lamp, of platinum, gives a brilliant light, with 3-quart cells, and is used for illustration . $4 50

BATTERIES.

SMEE BATTERY.

The Smee Battery elements are two zinc plates, between which a platinized plate is held by a clamp.

This Battery is used mostly for Electro-Medical Apparatus, namely, the Kidder, Glass and many other makes. It is charged with diluted sulphuric acid in the same proportion as used for the Bunsen Battery.

Cell, complete $2 00

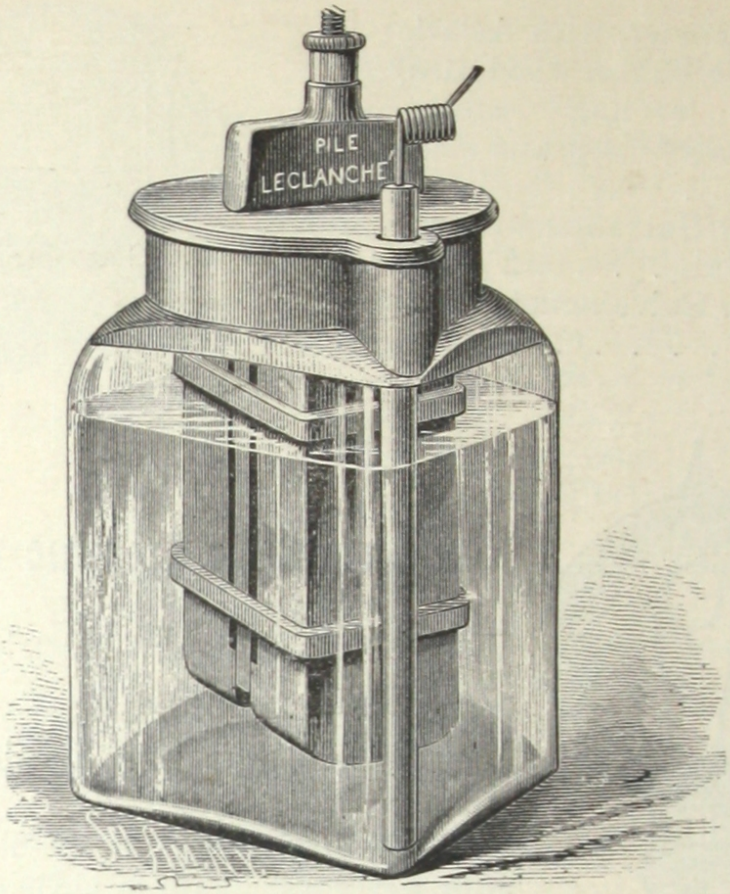
Zinc (rolled), $2\frac{1}{4}$ and $4\frac{1}{2}$ inches, per pair 40

Platinized Silver Plate and connection 1 00

Zinc Clamp 30

Jar, with lip 35

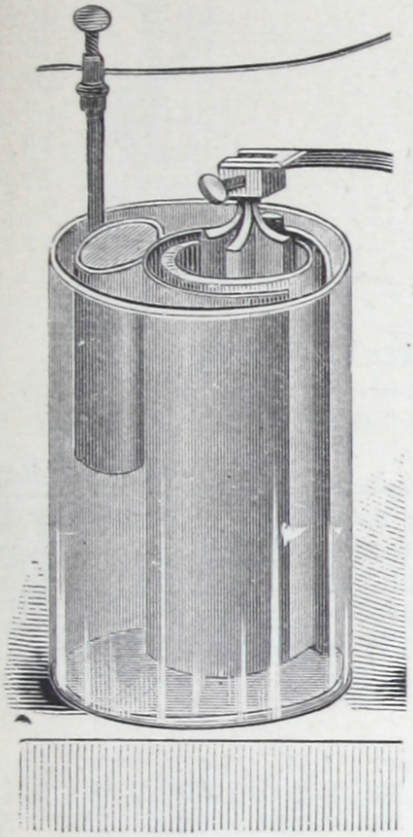
PRI EPHONE BATTERY.



This Battery is adopted by most Telephone companies; also, for open circuit use, mainly Electric Bells, Burglar Alarms, etc., on account of being more easily kept in order, as the compressed prisms can be readily renewed at less expense than the porous cups in the old style cells. It is not as constant as the other Batteries, but does remarkably well for the above purpose. It requires little attention, say once every three to twelve months. Sal-ammoniac and water is used in the jar.

Cell, complete	$1 65
Prisms, per pair	1 00
Carbon, mounted, complete	50
Glass Jar	20
Glass Jar Top	12
Zinc, amalgamated	12
Sal-ammoniac	8

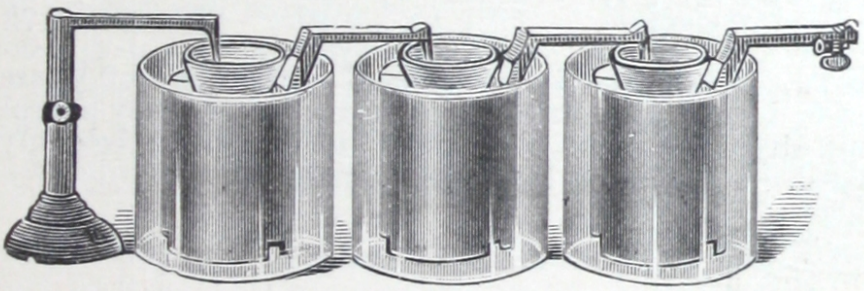
DANIELL'S BATTERY.



Per Cell, complete, Glass Jar	$1 50
Coppers, with pockets	50
" Shells	45
" Pockets	25
Porous Cups, per doz, No. 1	2 00
" each	20
Jars, glass	35
" " per dozen	4 00
Zincs	35
Zinc Clamps	20

This Battery is used mostly by Electro-Platers and for experiments. The current is very constant.

GROVE BATTERY.



Cell, complete, each	$1 60
Cell, complete, in series, each	1 40
Platinum Strips	70
Porous Cup	15
ar	25
Zinc	45

This Battery is used mostly for experimental purposes, electric light, etc. Its power is greater than the Bunsen Cell. Nitric acid is used in the porous cup, and diluted sulphuric acid about the zinc.

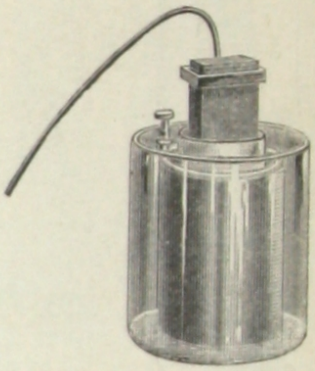
CARBON BATTERY.

	No. 1. 4x4 in.	No. 1½. 4½x4½ in.
Cell, complete	$1 30	$1 60
Zinc	40	50
Connector for Zinc	15	15
Carbon	12	35
Clamp for Carbon	10	15
Porous Cup	12	12
Jar	25	25
Platinum-faced Connection	22	22

BUNSEN BATTERY.

The Bunsen Battery being very powerful and producing a constant flow of current, is mainly used for electro-plating, electro-motors and by dentists for the electric plugger.

The acids used are nitric acid, or, if wished, bi chromate of potash solution may be used in the porous cup—its use obviates the fumes which naturally are caused by nitric acid, but the current produced is not quite as powerful—and diluted sulphuric acid (see page 13) is used in the jar. The fluids are to be at the same height.



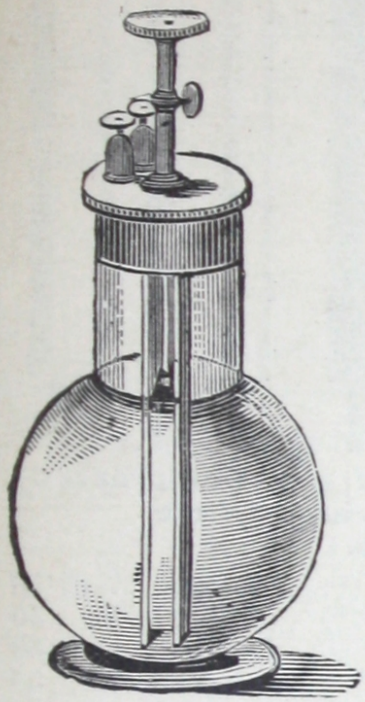
	½ pt.	1 pt.	1 qt.	2 qts.	1 gal.
Cell, complete	$0 90	1 20	1 50	2 00	2 75
Carbon	10	12	12	35	50
Carbon Connection	25	0	40	45	70
Glass Jar	13	20	25	30	35
Porous Cup	12	13	15	20	25
Zinc and Connection	30	40	60	70	1 00

Rolled zincs are used in my make of Carbon and of Bunsen Batteries, and are found far superior to the cast, as they are solid, not having air or sand holes. They last longer and can be easily amalgamated. There is less local action in the cell.

SOLUTION FOR AMALGAMATING ZINCS.

Mix one pound nitric with two pounds of hydrochloric acid, and add eight ounces mercury. When the mercury is dissolved, add three pounds more hydrochloric acid. To amalgamate the zinc, immerse it in this solution for one or two seconds, then remove it quickly to a dish of clean water, and rub it with a brush or cloth, when it will be found covered with a fine, even coat of mercury. This solution can be kept in a covered jar and used many time

GRENET BATTERY.



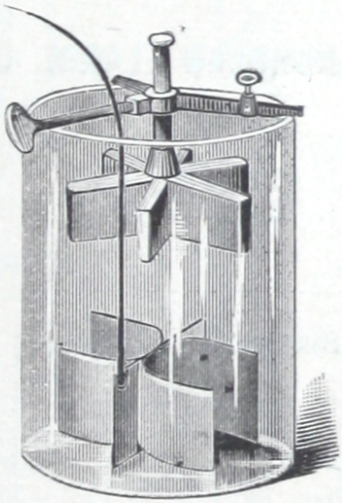
The Grenet Battery is a clean, portable cell. The elements are two carbon and a zinc plate. Bi-chromate of potash solution is used to charge the cell. When charged it is at all times ready for use, and no perceptable fumes arise from its action. The zinc is connected to a brass rod by which it can be immersed or drawn from the fluid. The Battery is advantageously adapted for experiments, Induction Coils, Electro-medical Batteries, etc , and it furnishes a great quantity of current.

CELLS COMPLETE.

No. 1.	6 inches	high,	½	pint	$2 00
" 2.	8 "	"	1	"	3 50
" 3.	10 "	"	1	quart	4 50
" 4	12 "	"	2	"	5 00
Extra Zinc, each					15 to 30

CALLAUD, OR GRAVITY BATTERY

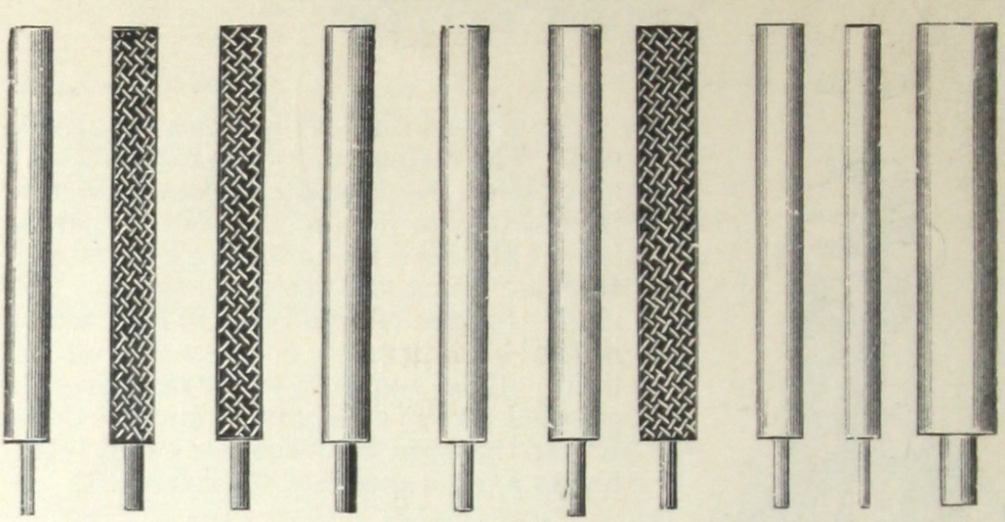
The Callaud, or Gravity Battery, is adapted for close or open circuit, has a constant current and requires very little attention. It is used on telegraph lines, electric bells, etc., and in a series fifty to one hundred and fifty cells for a permanent Galvanic Battery for physicians' office use.



	No. 1. Main 5x7 in.	No. 2. Main or Local 6x8 in.
Cell, complete	$ 90	$1 00
Zinc	30	35
Copper	18	20
Tripod Hanger	20	20
Jar	30	35

Estimates given for Batteries by the Quantity.

OFFICE WIRES.



Red and White Braided, Paraffined and Compressed Cotton and Linen Double Covered Office Wires--Fine Finish.

No. 12.	35 feet, per pound		$0 50
" 14.	52 " "		50
" 16.	90 " "		50
" 18.	132 " "		50

These wires in any other color at the same prices.

BURGLAR ALARM, CALL BELL AND ANNUNCIATOR WIRE.

Double Cotton Wrapped, Waxed and Paraffined.

No. 18	155 feet, per pound		$0 45
" 19	200 " "		50
" 20	239 " "		50

KERITE COVERED WIRE.

Size of Copper Core. Stubs' Gauge.	Outside Diameter in Fractions of an inch. Prices per foot.				
	3–32	4–32	5–32	6–32	7–32
No. 14			$0 04½	$0 06	
" 16		$0 03½	04	05	$0 07
" 18		02¾	03		
" 20	$0 02				

GALVANIZED IRON WIRE.

No. 0 to 9,	per pound	$0 10
" 10 to 11,	"	11
" 12,	"	12
" 13 and 14,	"	13

Prices per mile given on application.

PLIABLE CORD.

For Telephone, Medical Batteries, Pluggers, &c.

Silk Tinsel, per yard	$0 15
Cotton Tinsel, "	10
Silk, double, wire conductors, per yard	30
Cotton " " " "	20
Cords, worsted covers, double	30

MAGNET WIRE.

Brown & Sharpe's American Gauge.

No.	B. & S. Gauge.	Cotton.	Silk.
14	.07196	$ 45	
15	.05706	50	
16	.05082	50	$1 12
17	.04525	60	1 12
18	.04030	60	1 12
19	.03589	65	1 12
20	.03196	70	1 12
21	.02846	70	1 20
22	.02534	75	1 30
23	.02257	83	1 42
24	.0201	90	1 56
25	.0179	1 00	1 81
26	.01594	1 10	2 10
27	.01419	1 25	2 25
28	01264	1 35	2 38
29	.01125	1 50	2 75
30	.01002	1 65	2 95
31	.00892	1 80	3 25
32	.00795	1 95	3 45
33	.00708	2 40	3 90
34	.0063	2 85	4 10
35	.00561	3 25	5 20
36	.005	4 37	5 85
37	.00445	....	11 00
38	.00396	....	13 00

We can guarantee all our wire to be about 98 per cent. and above of pure copper.

The prices above are for quantities of one pound and upwards. 20 per cent. advance on ounce orders, and 10 per cent. advance on more than quarter pounds.

☞For numbers of feet, resistance, etc., see tables, pages 26 and 27.

Number, Diameter, Weight, Length and Resistance of

PURE COPPER WIRE.

AMERICAN GAUGE.

	Diam.	Weight. Sp. Gr. 8.889.		Length	Feet per Lb. Approximate.			Resistance of Pure Copper at 70° Fahrenheit.		
No.	Inches.	Grs. per Ft.	Lbs. p.1000 Ft.	Naked.	No.	Cotton Covered.	Silk Covered.	Ohms per 1000 Ft.	Feet per Ohm.	Ohms. per Lb.
7	.14428	440.27	62.90	15.90	7			.519	1928.75	.00824
8	.12849	349.18	49.88	20.05	8			.654	1529.69	.01311
9	.11443	276.94	39.56	25.28	9			.824	1213.22	.02083
10	.10189	219.57	31.37	31.88	10			1.040	961.91	.03314
11	.09074	174.15	24.88	40.20	11			1.311	762.93	.05269
12	.08081	138.11	19.73	50.69	12	42	46	1.653	605.03	.08377
13	.07196	109.52	15.65	63.91	13	55	60	2.084	479.80	.13321
14	.06408	86.86	12.41	80.59	14	68	75	2.628	380.51	.2118
15	.05706	68.88	9.84	101.63	15	87	95	3.314	301.75	.3368
16	.05082	54.63	7.81	128.14	16	110	120	4.179	239.32	.5355
17	.04525	43.32	6.19	161.59	17	140	150	5.269	189.78	.8515
18	.04030	34.35	4.91	203.76	18	175	190	6.645	150.50	1.3539
19	.03589	26.49	3.78	264.26	19	220	240	8.617	116.05	2.2772
20	.03196	21.61	3.09	324.00	20	280	305	10.566	94.65	3.423
21	.02846	17.13	2.45	408.56	21	360	390	13.323	75.06	5.443
22	.025347	13.59	1.94	515.15	22	450	490	16.799	59.53	8.654
23	022571	10.77	1.54	649.66	23	560	615	21.185	47.20	13.763
24	.0201	8.54	1.22	819.21	24	715	775	26.713	37.43	21.885
25	.0179	6.78	.97	1032.96	25	910	990	33.684	29.69	34.795
26	01594	5.37	.77	1302.61	26	1165	1265	42.477	23.54	55.331
27	.014195	4.26	.61	1642.55	27	1445	1570	53.563	18.68	87.979
28	.012641	3.38	.48	2071.22	28	1810	1970	67.542	14.81	139.893
29	.011257	2.68	.38	2611.82	29	2280	2480	85.170	11.74	222.449
30	.010025	2.13	.30	3293.97	30	2805	3050	107.391	9.31	353.742
31	.008928	1.69	.24	4152.22	31	3605	3920	135.402	7.39	562.221
32	.00795	1.34	.19	5236.66	32	4535	4930	170.765	5.86	894.242
33	.00708	1.06	.15	6602.71	33		6200	215.312	4.64	1421.646
34	.0063	.84	.12	8328.30	34		7830	271.583	3.68	2261.82
35	.00561	.67	.10	10501.35	35		9830	342.443	2.92	3596.104
36	.005	.53	.08	13238.83	36		12420	431.712	2.32	5715.36
37	.00445	.42	.06	16691.06				544.287	1.84	9084.71
38	.003965	.34	.05	20854.65				686.511	1.46	14320.26
39	.003531	.27	.04	26302.23				865.046	1.16	22752 6
40	.003144	.21	.03	33175.94				1091.865	.92	36223 59

TABLE SHOWING THE DIFFERENCE BETWEEN

WIRE GAUGES.

Diameter in Inches.

Number.	London.	Stubs'.	Brown & Sharpe's
7	.180	.180	.14428
8	.165	.165	.12849
9	.148	.148	.11443
10	.134	.134	.10189
11	.120	.120	.09074
12	.109	.109	.08081
13	.095	.095	.07196
14	.083	.083	.06408
15	.072	.072	.05706
16	.065	.065	.05082
17	.058	.058	.04525
18	.049	.049	.04030
19	.040	.042	.03589
20	.035	.035	.03196
21	.0315	.032	.02846
22	.0295	.028	.025347
23	.027	.025	.022571
24	.025	.022	.0201
25	.023	.020	.0179
26	.0205	.018	.01594
27	.01875	.016	.014195
28	.0165	.014	.012641
29	.0155	.013	.011257
30	.01375	.012	.010025
31	.01225	.010	.008928
32	.01125	.009	.00795
33	.01025	.008	.00708
34	.0095	.007	.0063
35	.009	.005	.00561
36	.0075	.004	.005
37	.0065		.00445
38	.00575		.003965
39	.005		.003531
40	.0045		.003144

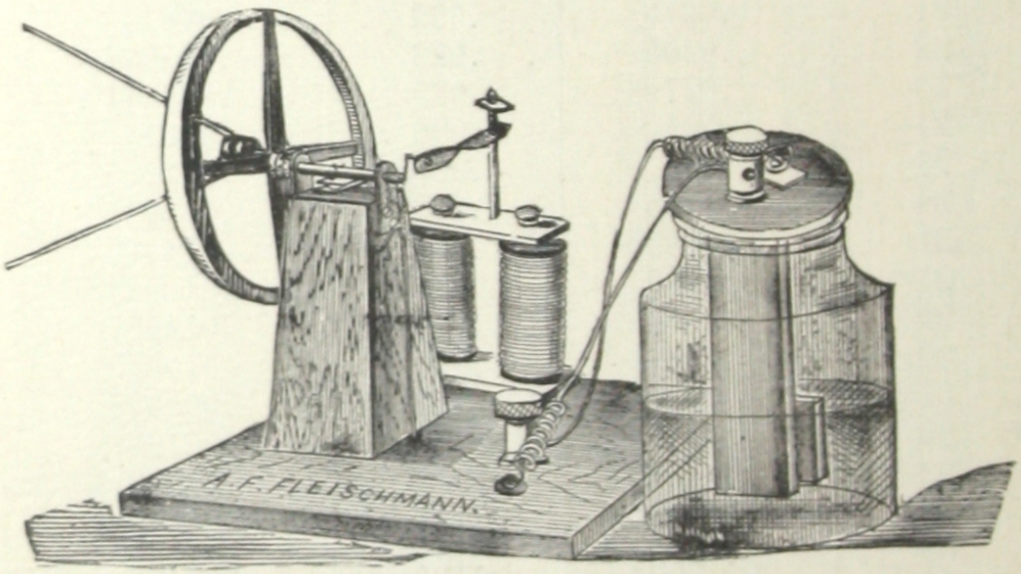
CARBON PLATES.

For Smee, Bunsen, Grenet and other Batteries.

Long.	Wide.	Thick.	Price.
6 inches	$\frac{3}{4}$ inch	$\frac{5}{16}$ inch	$0 12
6 "	$1\frac{1}{8}$ "	$\frac{5}{16}$ "	25
6 "	3 "	$\frac{1}{2}$ "	30
$5\frac{3}{4}$ "	$1\frac{7}{8}$ "	$\frac{1}{4}$ "	15
$4\frac{3}{4}$ "	$1\frac{5}{8}$ "	$\frac{1}{4}$ "	11
$4\frac{1}{4}$ "	$1\frac{5}{8}$ "	$\frac{1}{4}$ "	10
9 "	$1\frac{1}{8}$ "	$\frac{5}{16}$ "	50
10 "	3 "	$\frac{3}{4}$ "	60
7 "	$4\frac{1}{2}$ "	$\frac{1}{2}$ "	50
8 "	$5\frac{3}{4}$ "	$\frac{1}{4}$ "	45
9 "	$4\frac{1}{2}$ "	$\frac{1}{2}$ "	60
9 "	6 "	$\frac{1}{4}$ "	45
10 "	6 "	$\frac{1}{4}$ "	45
8 "	10 "	$\frac{1}{4}$ "	75
10 "	12 "	$\frac{1}{2}$ "	1 25
12 "	6 "	$\frac{1}{2}$ "	70
12 "	12 "	$\frac{1}{2}$ "	1 25

Carbons of any length, width and thickness made or cut to order.

ELECTRO-MOTOR.



This Apparatus is quite a novelty, and pleasing for illustrating the force of electricity and magnetism. The fly-wheel makes several hundred revolutions per minute, and by it a number of mechanical figures can be put in motion. The Motor, in connection with a half gallon Bunsen Battery, may be run for twenty to thirty hours continuously, to revolve a show table, a fan, etc.; or, in the laboratory

it may be utilized in different ways, for instance, for stirring liquids, etc. It will serve well where a small power is desirable. It is a cheap apparatus for schools, and makes an interesting present for young folks.

Price, complete, Motor with Battery Cell, solution for Cell, and full directions, all contained in a box $3 50
Motor, separate 2 75
Battery Cell, separate 1 00
Pint of solution 13
Solution bottle 10
Zincs, per pair 25
Solution (see page 13) same as for Galvanic Battery.

BATTERY MATERIALS, ETC.

Bottles not included.

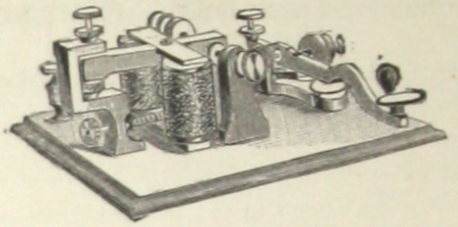
Rolled Zinc Plates, sizes containing 36 square inches and over, per lb $0 15
Glass Jar for Faradic Battery, with brass ring 75
Sulphuric Acid, per lb ..... 6 to 10
Nitric Acid, per lb 20
Muriatic Acid, per lb 15
Sal-Ammoniac, ground, per lb 20
Sal-Ammoniac, pulverized, per lb 25
Diluted Sulphuric Acid, per qt 10
Bi-chromate of Potash, per lb 25
Bi-chromate Solution, per lb ..... 10 and 13
Bi-chromate Solution, per gal ..... 50 and 60
Bi-chromate Solution, 6 gal 2 00
Mercury, per lb 75
Bi-sulphate of Mercury, per oz 10
Bi sulphate of Mercury, per lb 1 25
Amalgamating Fluid, per lb 25
Amalgam, for Frictional Machine, per oz 10
Sulphate of Copper, per lb 10
Sulphate of Zinc, per lb 10
Binding Posts, Nos. 1 and 2, each ..... 12 and 15
Double Binding Posts, each 20
Binding Posts, Nos 3 and 5, each ..... 8 and 10
Double Connectors, each ..... 12 and 15
Single Connectors, each ..... 8 and 10

Reductions made by ordering large quantities.

Repairing of all makes of Electrical Apparatus a specialty.

Supplies for Neff Battery and other makes on hand.

THE "RAPID" LEARNERS' OUTFIT.



We guarantee any person, young or old, with ordinary intelligence and diligent practice, with the above metioned "Rapid" Learners' Instrument Outfit to become competent operators.

"Rapid" Learners' Outfit, complete, with Battery, Book of Instruction, Wire, Chemicals, and all necessary materials for operating	$3 75
"Rapid" Learners' Instrument alone, without battery	3 00
" " Sounder, on base	2 00
" " Key, with table posts	1 20
Cell of Battery, complete, large No. 1, 5x7 inch	90
"Rapid" Learners' Instrument, without Battery, sent by mail, prepaid	3 50
"Rapid" Learners' Instrument, wound with fine wire, 20 ohms resistance, for use only on outdoor lines of from 200 feet to 10 or 15 miles in length, price, without Battery, etc	3 75
Same sent by mail, prepaid	4 00
"Rapid" Learners' Sounder, 20 ohms resistance, on base	2 75
Lightning Arrester and Ground Switch	90

Battery cannot be sent by mail.

Equipment and cost of a local practicing or communicating line, indoors, where two instruments are within 100 feet of each other.

2 Regular "Rapid Learners'" Outfits	$7 50
1½ lbs. Office Wire, extra, 225 feet	75
1 box Steel Staples	12
1 No. 1 Extra Cell of Battery, 5x7	90
	$9 27

Equipment and cost of an outdoor line of from 200 to 800 feet in length, with two instruments connected.

2 twenty ohm "Rapid" Learners' Instruments	$7 50
4 to 10 Cells of No. 1 Battery, 5x7, each	90
6 to 10 Pony Insulators and Brackets, each	08
1 lb. Office Wire	50
1 box Steel Staples	10
200 to 800 feet No. 12 Galvanized Telegraph Wire, per 100 feet	50

SUPPLIES FOR AMATEURS AND EXPERIMENT.

Hard Rubber Rods, Tubing, Sheeting, Cups, Magnet Heads, etc.
Brass Wire, Tubing, Rods, Sheeting, Machine Screws, etc.
Copper Wire, Sheeting, Tubing, Rods, etc.
Iron Wire, Rods, Tubing, Sheeting, Machine Screws, etc.
Steel Rods, Wire, Sheeting, etc.
Platinum Wire, Sheeting, etc.
Silver, Gold, Iridium, Nickel, etc.
Gongs, Screw Plates, Taps and other Goods.

Prices given on application.

BOOKS ON MEDICAL ELETRICITY.

ALTHAUS—Medical Electricity	$6 00
BARTHOLOW—Medical Electricity	2 50
BEARD & ROCKWELL—Medical and Surgical Electricity	6 25
ROCKWELL—Lectures on Electricity	1 25
BUTLER—Experience in Galvano-Surgery	50
BYRNE—Electro-Cautery in Uterine Surgery	1 25
DUCHENNE—Localized Electrization (Tibbit's translation)	3 00
HAMILTON—Clinical Electro-Therapeutics	2 00
HAYES—Electro-Thermal Bath	1 25
IVES—Electricity as a Medicine and its Mode of Application	1 00
MEYERS—Medical Electricity (Hammond's translation)	4 50
MORGAN—Electro-Physiology and Electro-Therapeutics	6 50
NEFTEL—Galvano-Therapeutics	1 50
POORE—Electricity in Medicine and Surgery	4 75
PRINCE—Galvano-Therapeutics	1 25
REYNOLDS—Lectures on the Clinical use of Electricity (American edition)	1 25
SCHWEIG—Galvanic Baths	1 50
SMITH—Lectures on Electricity	75
TIBBITS—A Hand-Book of Medical Electricity	2 00
WHITE—Medical Electricity	2 00

BOOKS ON ELECTRICAL SCIENCE.

ANDERSON—Lightning Conductors $6 50
BEECHY—Electro-Telegraphy 40
BELL—Researches in Electric Telephony 60
CLARK & SABINE—Electrical Tables and Formulæ 5 00
CROMPTON—Electric Light for Industrial Uses 40
CULLEY—Hand-Book of Practical Telegraphy 6 00
CUMMING—Introduction to the Theory of Electricity 2 25
DAVIS & RAE—Hand-Book of Electrical Diagrams and Connections 2 00
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SABINE—History of the Electric Telegraph 1 25
SCHWENDLER—Instructions for Testing Telegraph Lines 8 00
SHOOLBRED—Electric Lighting and its Practical Applications 2 00
SAWYER—Electric Lighting by Incandescence 2 50
THOMPSON—Elementary Lessons in Electricity and Magnetism 1 25
TYNDALL—Lessons in Electricity 1 00
URQUHART—Electro-Plating 2 00
URQUHART—Electro-Motors 3 00
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AWARDED FIRST PREMIUM AT PENN'A STATE FAIR, 1880.